

STUDIES IN NEOTROPICAL APOCYNACEAE I:
A REVISION OF THE GENUS *LAUBERTIA*

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ABSTRACT. A synopsis of the three species of the genus *Laubertia* (Apocynaceae, Apocynoideae, Echiteae) is presented here. Keys, descriptions, distributional data, and taxonomic index are provided.

Key Words: Gentianales, Apocynaceae, Apocynoideae, *Laubertia*, Neotropics

The small genus *Laubertia* was described by Alph. de Candolle in 1844, with a single species, *L. boissieri*. It was characterized by a corolla tube having a conspicuous annular corona, but without free corona lobes within, and by eglandular sepals without basal colleters. Following the classification of Endress and Bruyns (2000), within the tribe Echiteae, *Laubertia* is closely related to *Hylaea* J. F. Morales and *Prestonia* R. Br. The three genera are characterized as having in common features such as corolla tubes with conspicuous annular coronas or with five free corona lobes within. However, *Laubertia* is easily distinguished by its eglandular sepals, without basal colleters within, and corolla tubes without free corona lobes within. Because of the confusion concerning generic limits in the family, the species of this genus were described or placed in other genera (e.g., *Echites*, *Haemadictyon*). Other workers, such as Miers (1878) or Hemsley (1881), reduced the genus to the synonymy of *Exothostemon* G. Don and *Prestonia*, respectively. In 1897, unaware of the main features of *Laubertia*, Greenman described the monotypic genus *Streptotrachelus*. The next and most recent treatment of the genus was that of Woodson (1936). He considered *Laubertia* to comprise four species, reduced *Streptotrachelus* to synonymy, made two new combinations, and described one new species. Since then, there has been no comprehensive treatment of the genus. The description of several taxa in the last 60 years, new synonymy, and the necessity of taxonomic changes after the examination of types in European herbaria convinced me to update the genus.

Specimens of *Laubertia* are usually rare in herbaria: of the three species here recognized, only two are known from more than one collection, while the third one is known from just the type collection. For this review, about 136 collections from 26 herbaria were examined. As a reference for infrageneric classification within the Apocynaceae, I used the work of Endress and Bruyns (2000).

NOTEWORTHY MORPHOLOGICAL FEATURES

The main morphological characters are described in the taxonomic treatment. However, several features that deserve more detailed commentary are described below.

Leaves. The leaves of *Laubertia* are distinctive because of the presence of very diminutive cavities at the junction between the midvein and the secondary veins (Figure 1). These structures are very similar to domatia, but are formed by the disconnection of the side vein from the lamiar tissue, thus they do not represent that feature exactly. These inconspicuous structures are not present in every vein axil and may be lacking in some leaves, but are totally absent in the related genera *Hylaea* and *Prestonia*.

Domatia are foliar structures not very common in the family. In the neotropics they are present in several species of the genera *Forsteronia* G. May, *Malouetia* Alph. de Candolle, and *Tintinnabularia* Woodson.

Sepals. The sepals in *Laubertia* are eglandular (Figure 2), that is without basal colleters, while *Hylaea* and *Prestonia* always have calycine colleters that are entire to variously lacerate. Despite the fact that there are genera in other tribes of different subfamilies (e.g., Rauvolfioideae, Plumeriae) in which the sepals are variously glandular or eglandular (e.g., *Allamanda*), in the subfamily Apocynoideae the presence or absence of calycine colleters in the sepals is a very helpful feature for generic delimitation.

Corolla and corona. The corolla tube in *Laubertia* lacks free corona lobes within (Figure 3c). In *Prestonia*, these lobes [called epistaminal appendages by Woodson (1936)] are present and obvious in most of the species, reduced to callus ridges in some

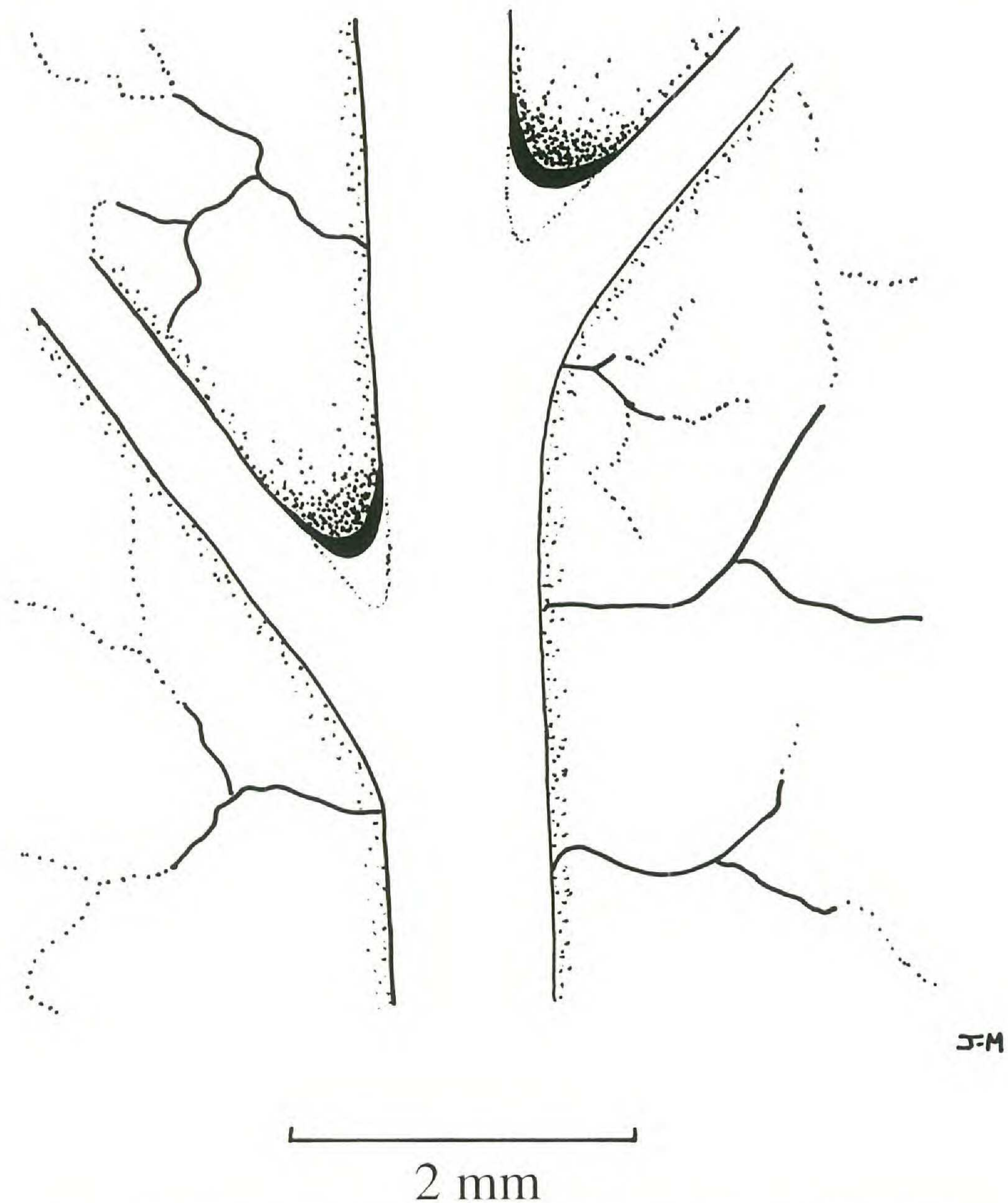


Figure 1. *Laubertia boissieri* (Neill 10081, INB). Midvein, showing cavities in their junction with secondary veins.

others, or are totally absent in just a few species. In *Hylaea*, the corona lobes are always present and totally exerted, but that genus lacks an annular corona, a character always present in *Prestonia* and *Laubertia*.

TAXONOMIC TREATMENT

Laubertia Alph. de Candolle, Prodr. 8: 486. 1844. TYPE: *L. boissieri* Alph. de Candolle.

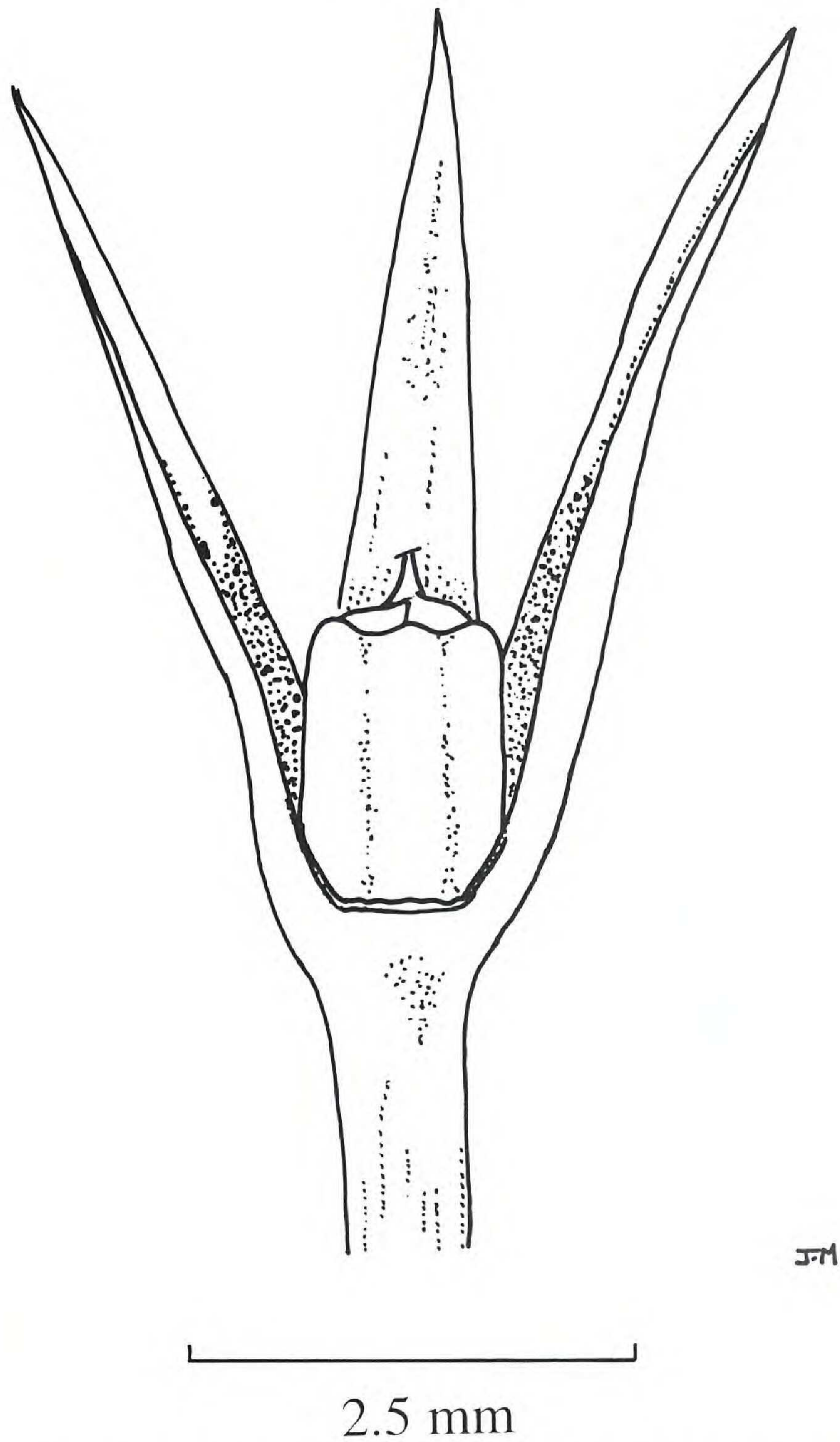


Figure 2. *Laubertia boissieri* (Neill 10081, INB). Calyx with glandular sepals.

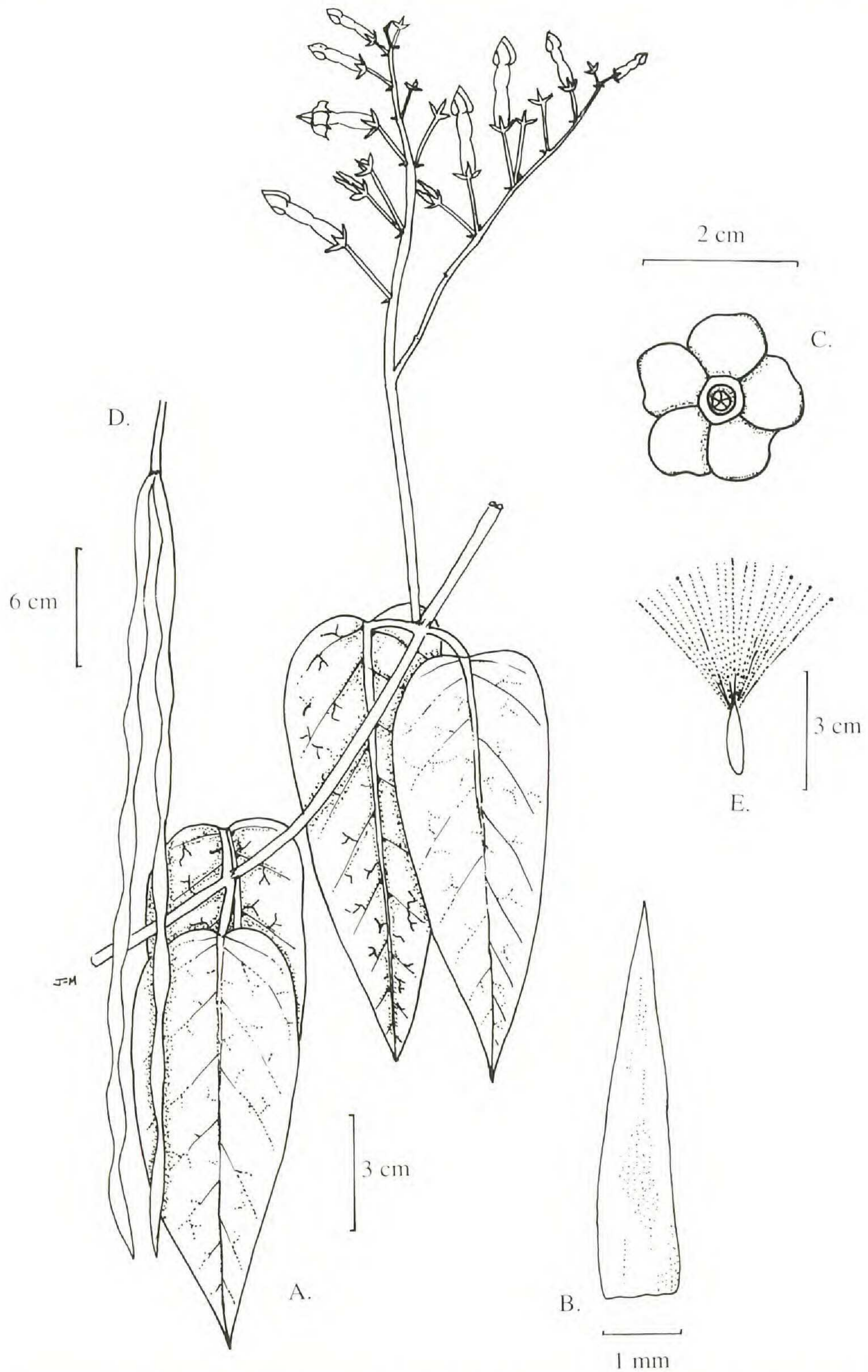


Figure 3. *Laubertia boissieri* (Neill 10081, INB). A. Habit; B. Sepal; C. Corolla; D. Fruits; E. Seed.

Echites P. Browne, Civ. Nat. Hist. Jamaica. 182. 1756, in part.

Prestonia R. Br., Mem. Wern. Soc. 69. 1809, in part.

Haemadictyon Lindl., Trans. Hort. Soc. London 6: 70. 1825 (1826), in part.

Exothostemon G. Don, Gen. Hist. 4: 70, 82. 1837, in part.

Streptotrachelus Greenm., Proc. Amer. Acad. Arts 32: 298. 1897. TYPE: *S. pringlei* Greenm. [= *Laubertia contorta* (M. Martens & Galeotti) Woodson].

Fruticose or suffruticose lianas. Stems terete to subterete, variously puberulent when young, usually glabrous to glabrate at maturity. Leaves opposite (very rarely ternate), petiolate, petioles slightly fused at the base, mostly glandular in the axils, with several inconspicuous and diminutive fusiform or conic colleters; blade glabrous, glabrate to very minutely puberulent, eglandular, without basal colleters adaxially. Inflorescence a scorpioid cyme, sometimes reduced and appearing simple or umbelliform, axillary, few- to many-flowered, glabrous or glabrate to minutely puberulent, pedunculate, bracts scarious, inconspicuous. Sepals 5, essentially equal, barely imbricate basally, without basal adaxial colleters within; corolla salverform, very minutely puberulent abaxially; tube straight to conspicuously twisted around the stamens, with an annular corona, without free corona lobes within, the limb 5-parted, actinomorphic, dextrorsely convolute; stamens 5, usually somewhat exserted, inserted in the upper part of the corolla tube; anthers connivent and adnate to the pistil head, consisting of 2 parallel, uniformly fertile thecae borne adaxially near the apex of an enlarged, peltate connective; auricles short, acute; carpels 2, united at the apex; pistil head fusiform or subcapitate; ovules numerous, multi-seriate, borne on an axile, biseriate placenta; disk glands 5, separate to very inconspicuously concrecent at the base, entire, distinct. Follicles 2, apocarpous, moniliform to more rarely continuous, glabrous, glabrate to very minutely puberulent, dehiscing along the ventral suture; seeds numerous, dry, truncate, comose apically, usually minutely rugose.

The genus comprises three species: one found in México; the second in Guatemala and Belize; and the third in South America in Colombia, Ecuador, Peru, and Bolivia.

KEY TO THE SPECIES OF *LAUBERTIA*

1. Corolla tube straight, not twisted around the stamens; plants

- from Colombia, Ecuador, Peru, and Bolivia
- 1. *L. boissieri*
1. Corolla tube twisted around the stamens; plants from México, Guatemala, and Belize (2)
2. Corolla purple to lilac, the tube 18–23 mm; anthers 6.5–7.5 mm long; México 2. *L. contorta*
2. Corolla white, the tube 10–14 mm long; anthers 5 mm long; Guatemala and Belize 3. *L. peninsularis*

1. *Laubertia boissieri* Alph. de Candolle, Prodr. (DC.) 8: 487. 1844. TYPE: ECUADOR. Locality lacking, 1778–1788 (fl), *Pavón s.n.* (LECTOTYPE selected here: G-BOIS!; ISOLECTOTYPES: F!, G-BOIS!, G-DC!, photograph Field negative 34137 at F!, INB!, MO!, NY *ex* G-DC!). Figure 3.

Echites dichotoma Kunth in Humboldt et al., *syn. nov.*, Nov. Gen. Sp. 3: 217 (ed. qui), 9 Jul 1819 [1818], non Thunberg, 21 Apr 1819. *Mesechites dichotoma* (Kunth) Miers, Apocyn. S. Am. 233. 1878. TYPE: COLOMBIA. Vaupés: between Jaen and Amazon River, Aug (year lacking; fl), *Humboldt & Bonpland 3627* (HOLOTYPE: P-HB!, photograph at INB!).

Echites sanctae-martae Rusby, Descr. S. Amer. Pl. 85. 1920.

Laubertia sanctae-martae (Rusby) Woodson, *syn. nov.*, Ann. Missouri Bot. Gard. 18: 555. 1931. TYPE: COLOMBIA. Magdalena: Above Jiracasaca, 3000 ft., 25 Aug 1898–1899, (fl, fr), *Smith 2525* (HOLOTYPE: NY!; ISOTYPES: BR!, CM!, F!, G! [2 sheets], GH!, K! [2 sheets], MICH!, MO!, P! [2 sheets], photocopy at INB *ex* BR!; photograph Field negative 56466 at INB *ex* F!).

Echites eggersii Markgr., Notizbl. Bot. Gart. Berlin-Dahlem 9: 78. 1924. TYPE: ECUADOR. Manabí: near El Recreo, 30 Apr 1897 (fl), *Eggers 15684* (HOLOTYPE: B destroyed; LECTOTYPE selected here: O!; ISOLECTOTYPES: C!, F!, K! [2 sheets], M!, MO!, NY!, O!, P!, S!, photocopy at INB *ex* O!, photograph Field negative 56465 at INB *ex* F!).

Liana; branchlets terete to subterete, very minutely and inconspicuously brownish puberulent to ferruginous-puberulent, glabrous to glabrate at maturity; nodal colleters inconspicuous, ca. 1 mm long. Leaves usually opposite, very rarely ternate; petioles 5–17 mm long; blade 5.2–14 (16) × (1.5) 2–5.6 cm, membranaceous to firmly membranaceous, elliptic to ovate-elliptic, very sparsely or minutely and inconspicuously puberulent when young, usually glabrous to glabrate on both surfaces at maturity, acuminate or short-acuminate to narrowly acute apically, obscurely cordate to more or less obtuse basally. Inflorescence conspicuously longer than the subtending leaves, axillary, very minutely

and inconspicuously ferruginous puberulent to glabrate, few- to many-flowered; peduncle 22–80 mm long; pedicels 8–18 mm long; bracts 1–3 × 0.5–1 mm, scarious. Sepals 2–6 × 1–1.5 mm, narrowly ovate to narrowly linear-ovate, long-acuminate, very minutely and sparsely ferruginous puberulent to glabrate; corolla reddish-pink, or reddish-purple to purplish, very minutely brownish puberulent without, tube 12–27 × 3–5 mm, conspicuously inflated basally, straight, not twisted; lobes 10–18 × 6–11 mm, narrowly obovate to narrowly elliptic, spreading; anthers 5–6 mm long, glabrous to very minutely puberulent dorsally; ovary 1.5–2 mm long, glabrous to glabrate; style head 2–2.5 mm long; disk glands about as long as the ovary. Follicles 25–75 × 2–4 mm, glabrous or glabrate to very inconspicuously, minutely, and sparsely puberulent, obscurely moniliform; seeds 15–19 mm long, glabrous, glabrate, to minutely papillate, coma 2.5–4.8 cm long, creamish to tannish.

DISTRIBUTION AND PHENOLOGY. The species is found in northern Colombia, southern Ecuador, Peru, and Bolivia at 200–1600 m elevation. It flowers and fruits all year, but mostly July to February.

Laubertia boissieri is easily recognized by its straight corolla tube and distribution disjunct from the other two species of the genus.

Echites dichotoma was included in the synonymy of *Mesechites trifida* (Jacq.) Müll. Arg. by Woodson (1936). However, it is obvious that he never saw the type, because it is obviously conspecific with the type of *Laubertia boissieri*.

Laubertia sanctae-martae is here relegated to the synonymy of *L. boissieri*. Woodson (1936) separated these taxa based on the inflorescence structure and sepal shape. At the time of his revision, only five collections were available from these two species. Since then, many further collections reveal that sepal shape can vary from ovate and acute apically to very narrowly ovate and long acuminate. Corolla length is also very variable in the specimens examined and does not warrant the distinction of these taxa. Regarding inflorescence structure, Woodson cited “Inflorescence rather obscurely compound to essentially simple” for *L. sanctae-martae*; however, the Brussels (BR) isotype, which was not examined by Woodson, shows a conspicuously compound inflorescence. Therefore, all supposed differential characters are

ineffective, so *L. sanctae-martae* is relegated to the synonymy of *L. boissieri*.

SPECIMENS EXAMINED: BOLIVIA. La Paz: Inquisivi, Lakachaka, mouth of the Río Aguilani, 21 Sep 1991 (fl), *Lewis 40417* (LPB, MO); NorYungas, Río Unduavi valley, 6 Sep 1987 (fl, fr), *Seidel & Vargas 1103* (LPB, MO); Sud Yungas, E of Puente Villa, road to Chulumani, 28 Sep 1985 (fl, fr), *Solomon & Nee 14272* (INB, MO).

COLOMBIA. Magdalena: flanco N de la Sierra Nevada de Santa Marta, 3 Mar 1948 (fl), *Romero-Castañeda 762* (COL, MO); Sierra Nevada de Santa Marta, 1898–1899 (fl), *Smith 1643* (G).

ECUADOR. Esmeraldas: Fila de Bilsa, E of San José de Bilsa, 20 Jan 1991 (fl), *Gentry et al. 72942* (MO). Los Ríos: Río Palenque Science Center, between Santo Domingo and Quevedo, 16 Jul 1986 (fl, fr), *Gentry & Dodson 54859* (MO [2 sheets], WAG). Napo: Jatun Sacha Biological Reserve, near Puerto Misahualli, 8 Nov 1987 (fl, fr), *Cerón 2628* (MO, USF); Jatun Sacha Biological Station, Río Napo, E of Misahuallí, 17 Feb 1988 (fl), *Cerón 3687* (MO, USF); Orellana, Pompeya, 5 Aug 1992 (fr), *Neill 10081* (INB, MO, QCNE). Orellana: Yasuní National Park, 3 Nov 1998 (fl, fr), *Burnham 1794* (INB, MICH, MO). Province unknown: San José, Chimborazo, Jul 1876 (fl), *André 4051* (K [2 sheets]).

PERU. Cajamarca: San Ignacio, Chirinos, Mandinga, 5 Feb 1996 (fl, fr), *Campos & Díaz 2412* (INB, MO); San Ignacio, Huarango – San Martín, 15 May 1996 (fr), *Vásquez & Vásquez 20860* (INB, MO); Pucará, 14 Apr 1960 (fl), *Woytkowski 5680* (G, MO). Junín: Chanchamayo, La Merced – Villa Rica Road, between Puente Paucartambo and Río Colorado, 6 Jan 1984 (fl, fr), *Smith et al. 5625* (MO, USF); Yaupi, 23 Jun 1961 (fr), *Woytkowski 6326a* (MO), 30 Jun 1961 (fl, fr), *Woytkowski 6353* (MO [2 sheets]). San Martín: Muña, 23 May–4 Jun 1923 (fl), *Macbride 3902* (F, US); La Merced, Aug 1923 (fl, fr), *Macbride 5473* (F, K, US).

2. *Laubertia contorta* (M. Martens & Galeotti) Woodson *in* Britton, N. Amer. Fl. 29: 187. 1938. Figure 4.

Haemadictyon contortum M. Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11: 360. 1844. *Exothostemon contortum* (M. Martens & Galeotti) Miers, Apocyn. S. Am. 241. 1878. *Prestonia contorta* (M. Martens & Galeotti) Hemsl., Biol. Cent.-Amer., Bot. 2: 311. 1881. TYPE: MEXICO. Oaxaca: Zacatepec, date lacking (fl), *Galeotti 1588* (HOLOTYPE: BR!).

Streptotrachelus pringlei Greenm., Proc. Amer. Acad. Arts 32: 298. 1897. *Laubertia pringlei* (Greenm.) Woodson, Ann. Missouri Bot. Gard. 18: 555. 1931. TYPE: MEXICO. Morelos: lava beds near Cuernavaca, 23 Sep 1896 (fl), *Pringle 6554* (HOLOTYPE: GH!; ISOTYPES: F!, G!, GH!, K! [2 sheets], MO! [2 sheets], NY!, P!, S!).

Prestonia langlassei Standl., Contr. U.S. Natl. Herb. 23: 1159. 1924. TYPE: MEXICO. Michoacán: La Correa, 50 m, 8 Oct 1898 (fl), *Langlasse 435* (HOLOTYPE: US!; ISOTYPES: G! [2 sheets], GH!, K!, P!).

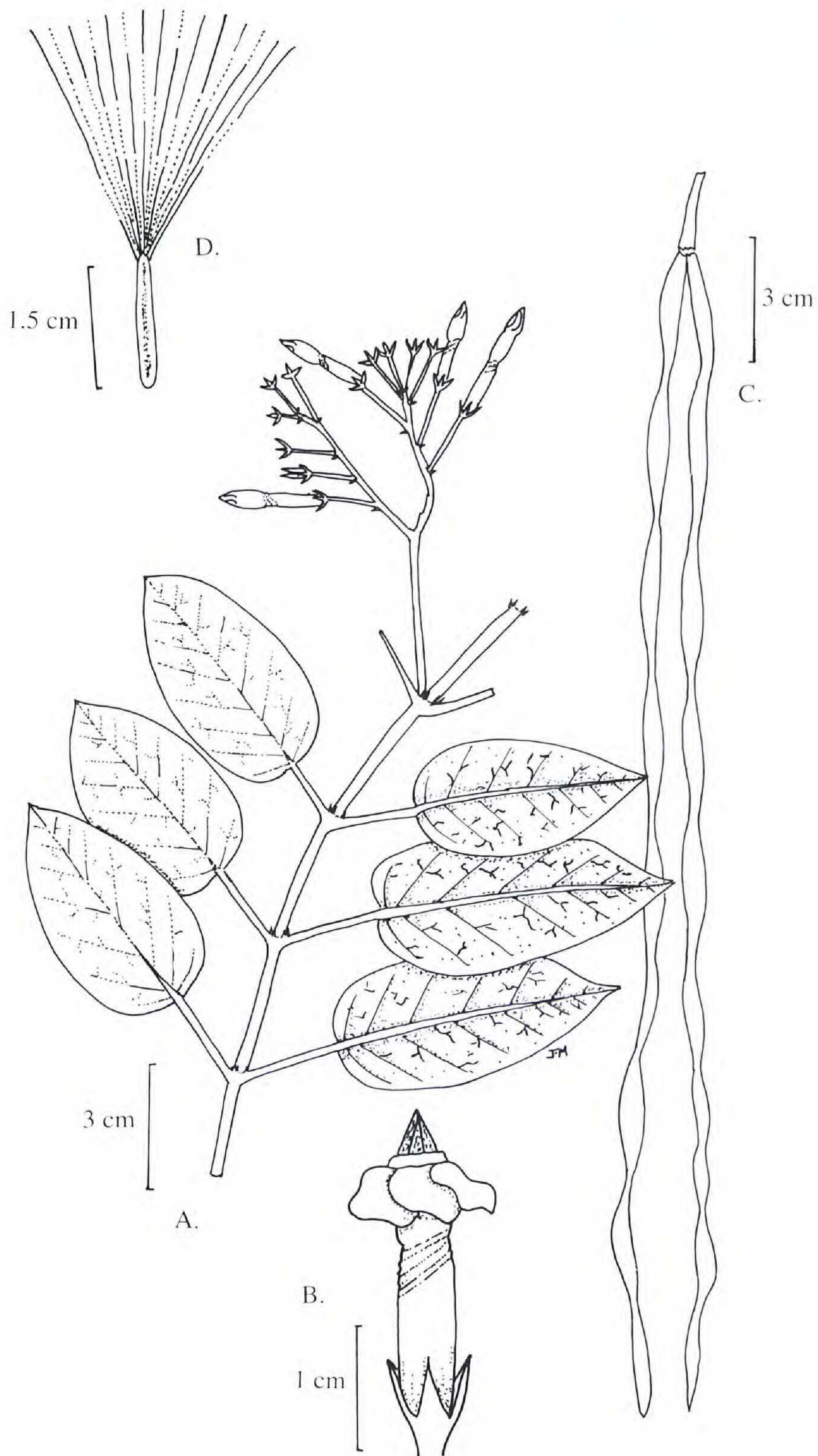


Figure 4. *Laubertia contorta* (Martínez & Stevens 23849, INB). A. Habit; B. Corolla; C. Fruits; D. Seed.

Liana; branchlets terete to subterete, very inconspicuously to sparsely and minutely puberulent when young, glabrate at maturity; nodal colleters 1–2 mm long. Leaves opposite; petioles 10–32 mm long; blade 4–9 × 2.5–5.7 cm, membranaceous, elliptic or ovate-elliptic to narrowly ovate, very sparsely and inconspicuously puberulent to more commonly glabrous or glabrate on both surfaces, acute to shortly and abruptly cuspidate to acuminate apically, obtuse to inconspicuously or conspicuously cordate basally. Inflorescence variously shorter or longer than the subtending leaves, axillary, densely and minutely puberulent, many-flowered; peduncle 25–65 mm long; pedicels 7–27 mm long; bracts 1–1.5 × 0.5 mm, scarious. Sepals 3–5 × 1–1.5 mm, narrowly ovate, acuminate to long-acuminate, densely and minutely puberulent, corolla purple to lilac, moderately to sparsely puberulent without, tube 18–23 × 3–5 mm, conspicuously inflated basally, twisted around the stamens; lobes 7–10 × 3.5–5 mm, narrowly obovate, spreading; anthers 6.5–7.5 mm long, minutely puberulent dorsally, rarely glabrate, the tips exerted; ovary ca. 1.5 mm long, densely hirtellous; style head 2.5–3 mm long; disk glands about as long as the ovary. Follicles 27–31 × 0.2–0.4 cm long, very minutely and densely puberulent, moniliform; seeds 14–16 mm long, very minutely papillate puberulent, coma 2.7–3.5 cm long, tannish.

DISTRIBUTION AND PHENOLOGY. *Laubertia contorta* is endemic to central and southern Mexico, at 50–1550 m elevation. It flowers from June to October. Fruiting collections are from September to December.

This species is somewhat related to the South American *Laubertia boissieri*, from which it can be distinguished chiefly by the twisted corolla tube and its disjunct geographical distribution.

SPECIMENS EXAMINED: MEXICO. Chiapas: along road from Tuxtla Gutiérrez to the Chicoasen, San Fernando, 9 Sep 1976 (fl), *Breedlove 39960* (MO); E of Motozintla, road to Frontera Comalapa, Amatenango, 18 Sep 1988 (fl, fr), *Martínez & Stevens 23849* (INB, MEXU); Tuxtla Gutiérrez, 5 Jul 1990 (fl), *Reyes et al. 1755* (BM, INB, MEXU). Guerrero: Temascaltepec, Ixtapan, 23 Jul 1932 (fl), *Hinton 1156* (G, K, MO); Chorrera, Temascaltepec, 24 Jun 1933 (fl), *Hinton 4581* (K); Naranjo, Temascaltepec, 17 Oct 1933 (fl, fr), *Hinton 5009* (K [2 sheets], MO); Ixtapan, 24 Jun 1935 (fl), *Hinton 7919* (K, MO); Placeres, Mina, 31 Jul 1936 (fl), *Hinton 9183* (K, MO); Montes de Oca, 1 Jul 1937 (fl), *Hinton 10544* (K, MO [2 sheets], TEX); Atoyac, Galeana, 12 Aug 1937 (fl), *Hinton 11005* (K); Petatlán, Acapulco – Zihuatanejo Road, 22 Oct 1983 (fl), *Martínez*

& Silva 5898 (INB, MEXU). Jalisco: Estación Chamela, Arroyo Colorado, 12 Aug 1985 (fl), Ayala 115 (MEXU, MO); Estación Biológica Chamela, 13 Oct 1983 (fl), Lott & Hernández 1484 (MEXU, MO). México: near Mexicaltepec, NW of Iguala, 6 Jul 1982 (fl), Soto & Martínez 3969 (MEXU, MO). Nayarit: SW of Jesús María, road to La Mesa del Nayar, 28 Jul 1990 (fl), Flores *et al.* 2127 (MEXU, MO). Oaxaca: Chinantla, 1840 (fl), Galeotti 1596 (G), Galeotti 1600 (G, P); La Gritona, SW of Putla to Pinotepa Nacional, 5 Apr 1982 (fl), Torres & Tenorio 230 (MEXU, MO). San Luis Potosí: San Luis Potosí, Huasteca Potosina, date lacking (fr), Villa *s.n.* (CIDIR, INB). Sinaloa: Concordia, Mazatlán – Durango Road, 6 Dec 1982 (fr), Aguilar *et al.* 102 (INB, MEXU); Rosario, NE of Chilillos, 26 Jul 1983 (fl), Martínez *et al.* 4067 (MEXU, MO); Sierra Madre, near Colomás, Jul 1897 (fl), Rose 1716 (MO, US). Data lacking: Sessé y Lacasta & Moçño 5175 (MA, photograph Field negative 41244 at INB).

3. *Laubertia peninsularis* Woodson, Ann. Missouri Bot. Gard. 23: 374. 1936. TYPE: BELIZE. Undesignated locality near Belize–Guatemala boundary, date lacking (fl), Schipp *s.n.* (HOLOTYPE: MO!). Figure 5.

Laubertia gentlei Lundell, Wrightia 5: 256. 1976. TYPE: BELIZE. Toledo: Manga Camp, Edwards Road beyond Columbia, 12 Apr 1948 (fl), Gentle 6505 (HOLOTYPE: TEX!; ISOTYPES: F!, MO!, S!, photograph Field negative 61421 at INB *ex F!*).

Liana; branchlets terete to subterete, densely ferruginous-tomentulose, sparsely puberulent at maturity; nodal colleters less than 1 mm long, inconspicuous. Leaves opposite, petioles 9–36 mm long; blade 4.2–11.5 (–13.2) × 1.5–4.7 (–6.8) cm, membranaceous, elliptic or narrowly elliptic to narrowly ovate-elliptic, very sparsely puberulent above, densely ferruginous-puberulent beneath, turning glabrate at maturity, acuminate to caudate-acuminate apically, obtuse or rounded to very obscurely cordate basally. Inflorescence variously shorter or longer than the subtending leaves, axillary, densely and minutely ferruginous-puberulent, many-flowered, the flowers agglomerate at ends of the branches; peduncle 41–60 (–155) mm long; pedicels 7–11 mm long; bracts 2–4 mm × 0.5–1 mm, scarious. Sepals 5–10 × 1.5–2 mm, narrowly elliptic to linear, acuminate, ferruginous-puberulent within and without. Corolla white, tube 10–14 × 2 mm, conspicuously inflated basally, twisted around the stamens; lobes 7–11 × 2 mm, narrowly obovate, spreading; anthers ca. 5 mm long, the tips exerted; ovary 1.5–2 mm long, glabrous; style head ca. 2.5 mm long; disk glands somewhat shorter than the ovary. Follicles unknown.

DISTRIBUTION AND PHENOLOGY. Known only from type collection,

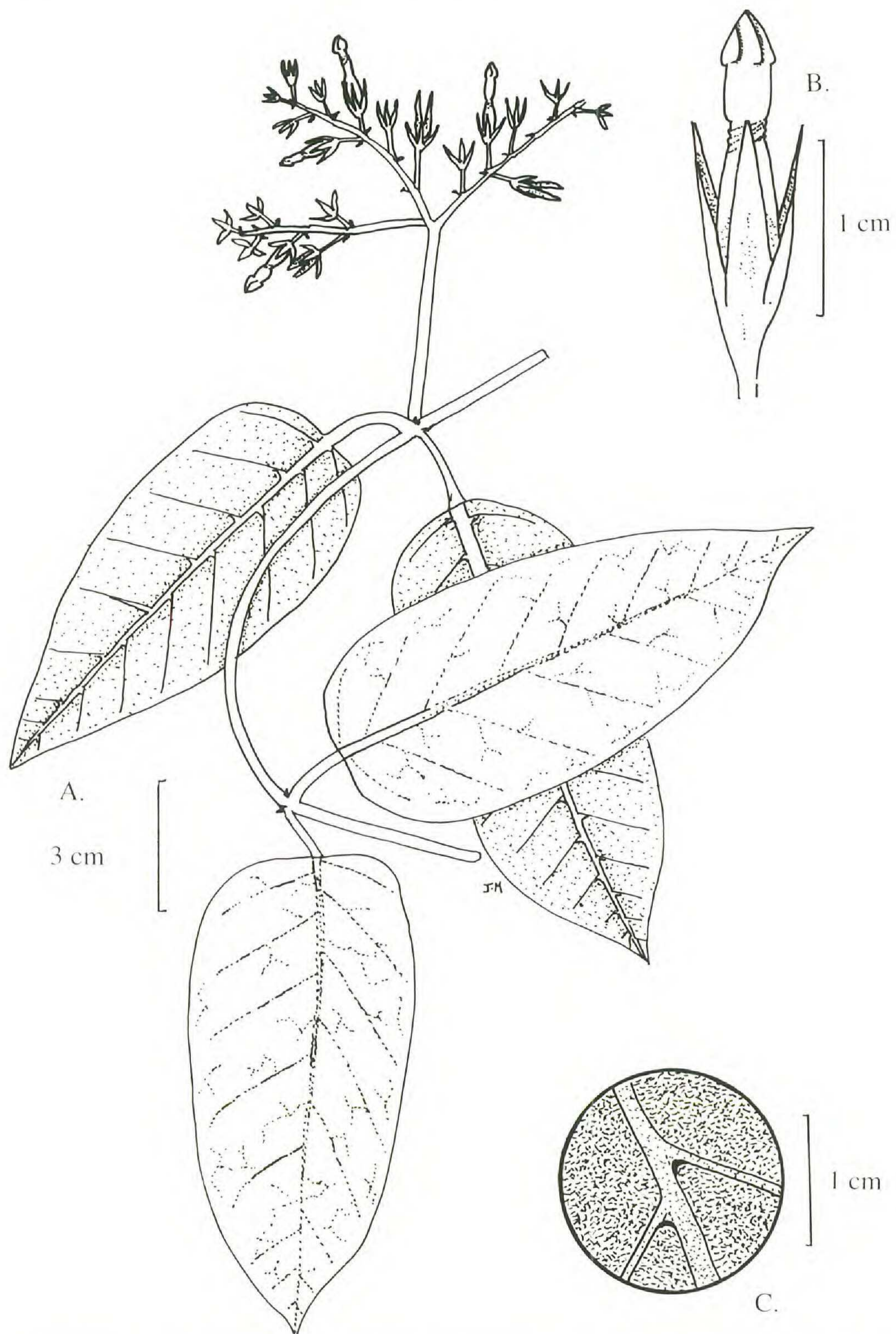


Figure 5. *Laubertia peninsularis* (Gentle 6505, MO). A. Habit; B. Corolla and calyx; C. Leaf pubescence (abaxial).

this species is restricted to eastern Guatemala and Western Belize, below 200 m. It flowers in April.

This very distinctive species is poorly known and it has not been collected since the type collection. The main distinguishing character is the small corolla tube, which is twisted around the stamen attachment. The characters used to distinguish *Laubertia gentlei* Lundell from *L. peninsularis* are spurious, as was shown by Morales (1999).

EXCLUDED SPECIES

Laubertia laxiflora Rusby, Bull. New York Bot. Gard. 4: 408. 1907. TYPE: BOLIVIA. Data lacking, *Bang 2056* (HOLOTYPE: NY; ISOTYPES, NY, US, photocopy at INB *ex* NY) = *Odontadenia laxiflora* (Rusby) Woodson.

ACKNOWLEDGMENTS. I thank the curators and directors of BM, BR, C, CIIDIR, CM, COL, F, G, G-BOIS, G-DC, GH, K, LPB, MEXU, MICH, MO, NY, O, P, P-HB, QCNE, S, US, and USF for providing specimens on loan.

LITERATURE CITED

- ENDRESS, M. E. AND P. BRUYNS. 2000. A revised classification of the Apocynaceae *s.l.* The Bot. Rev. 66: 1–56.
- GREENMANN, J. M. 1897. Descriptions of new and little known plants from Mexico. Proc. Amer. Acad. Arts 32: 295–311.
- HEMSLEY, W. B. 1881. Apocynaceae, Vol. 2. *In*: F. D. Godman and O. Slavin, eds., *Biologia Centrali-americani*, Botany. London, U.K.
- MIERS, J. 1878. On the Apocynaceae of South America. Williams and Norgate, Edinburgh, U.K.
- MORALES, J. F. 1999. Miscellaneous notes on *Temnadenia* and *Laubertia* (Apocynaceae). Novon 9: 240.
- WOODSON, R. E. 1936. Studies in the Apocynaceae. IV. The American genera of Echitoideae XXVI. Ann. Missouri Bot. Gard. 23: 169–438.

APPENDIX 1

INDEX TO NAMES IN SYSTEMATIC TREATMENT

Accepted names in italics.

Echites Jacquin

E. dichotoma Kunth (= *L. boissieri*)

E. eggersii Markgr. (= *L. boissieri*)

- E. sanctae-martae Rusby (= *L. boissieri*)
- Exothostemon G. Don
E. contortum (M. Martens & Galeotti) Miers (= *L. contorta*)
- Haemadictyon Alph. de Candolle
H. contortum M. Martens & Galeotti (= *L. contorta*)
- Laubertia* Alph. de Candolle
L. boissieri Alph. de Candolle
L. contorta (M. Martens & Galeotti) Woodson
gentlei Lundell (= *L. peninsularis*)
L. peninsularis Woodson
pringlei (Greenm.) Woodson (= *L. contorta*)
sanctae-martae (Rusby) Woodson (= *L. boissieri*)
- Prestonia R. Br.
P. contorta (M. Martens & Galeotti) Hemsl. (= *L. contorta*)
P. langlassei Standl. (= *L. contorta*)
- Streptotrachelus Greenm.
S. pringlei Greenm. (= *L. contorta*)

APPENDIX 2
INDEX TO EXSICCATAE

- Aguilar, R. et al. 102 (2)
André, E. 4051 (1)
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Breedlove, D. 39960 (2)
Burham, C. 1794 (1)
Campos, J. & O. Díaz 2412 (1)
Cerón, C. 2628 (1); 3687 (1)
Eggers, B. 15684 (1)
Flores, G. et al. 2127 (2)
Galeotti, H. G. 1588 (2); 1596 (2); 1600 (2)
Gentle, P. 6505 (3)
Gentry, A. & C. Dodson 54859 (1)
Gentry, A. et al. 72942 (1)
Hinton, G. 1156 (2); 4581 (2); 5009 (2); 7919 (2); 9183 (2); 10544 (2); 11005 (2)
Humboldt, F. W. H. A. & A. J. A. Bonpland, 3627 (1)
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